

"GAINS FROM TRADE"

"Laissez faire, telle devrait être la devise de toute puissance publique, depuis que le monde est civilisé.... Détestable principe que celui de ne vouloir grandir que par l'abaissement de nos voisins! Il n'y a que la méchanceté et la malignité du coeur de satisfaites dans ce principe, et l'intérêt y est opposé. Laissez faire, morbleu! Laissez faire!"

(René de Voyer, Marquis d'Argenson, *Journal et Memoires*, 1736) ¹

"I shall therefore venture to acknowledge that not only as a man, but as a British subject I pray for the flourishing commerce of Germany, Spain, Italy and even France itself."

(David Hume, 1758, *Of the Jealousy of Trade*)

"No nation was ever ruined by trade, even seemingly the most disadvantageous."

(Benjamin Franklin and George Whately, 1774, *Essay on the Principles of Trade*)

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See also addendums:

- "Math Notes #1" (required)
- "Production Possibilities"

¹ Transl: "Leave it be, that should be the motto of every public power, which makes the world civilized..... The idea that we can only grow at the expense of our neighbors is detestable! It only satisfies those with mischief and malignity of heart, and is contrary to our own interest. Leave it be, for crying out loud! Leave it be!!!"

FOREIGN TRADE

We have seen that exchange among people improves allocation. What about trade among nations? Surely what is sensible for an individual ought to be sensible for countries as a whole? That if we have a nation which has lots of cloth trades and another nation that has a lot of grain, both will better off by trading with each other?

Surprisingly, this idea has had a harder time reaching politicians than it should. And I'm not merely talking about bemoaning NAFTA or foot-dragging on the WTO. Even today, politicians will speak of things like 'energy independence' as if that were a useful goal. Why does it need to produce its own energy? I am personally not energy-independent – I purchase electricity and fuel from Con Edison. It makes sense. Rather than foot-pumping my own generator for four hours every morning for my daily electricity needs, it is a more efficient use of my time (and the world's resources) to just purchase it from ConEd. Why should my country not do the same, concentrate on what it does best, and buy its energy from abroad?

Alas, trade is where the straightforward simple truths of economic logic and the messy reality of domestic & international politics are often at odds.

MERCANTILISM

The modern suspicion of foreign trade has part of its roots in an economic doctrine that prevailed in Europe in the 17th & 18th Centuries known as "**Mercantilism**". Mercantilism belongs to the 'prehistory' of economics, before it became a field of study. The doctrines of Mercantilism were articulated by a disparate collection of writers, journalists and pamphleteers (heavily, but not exclusively, British). Their motivation to write on economic matters was motivated less by an effort to 'understand' how the economy works, and more to contribute to urgent policy discussions of the day.

The Dutch Puzzle

In the late 1600s, the height of Mercantilism, the urgent topic of national & international political discussion was **the Netherlands puzzle**. The Netherlands was a tiny country, with very few resources. But it had managed to spectacularly transform itself almost overnight from a collection of poor, sleepy fishing villages into probably the wealthiest and most powerful country in the world, with an empire that stretched across the globe and whose citizens enjoyed probably the highest standard of living yet seen on earth.

The sudden and spectacular Dutch prosperity provoked the envy and puzzlement of her neighbors. English, French and Spanish commentators discussed how to emulate (and challenge) the Dutch example. These commentators were known as **Mercantilists**. Notable Mercantilists of this era include the English writers William Petty, John Locke, Sir Dudley North, Sir Josiah Child and the French ministers Jean-Baptiste Colbert and Jacques Necker.

The Mercantilists concluded that the Dutch achieved their wealth by maintaining a '**favorable balance of trade**'. They noticed that the Dutch exported expensive 'high-value' manufactured goods (notably finished cloth & iron goods like tools, guns, etc.) and only imported cheap 'low-value' primary goods (raw wool and iron ore, inputs needed for their industries). As a result, they exported more value than they imported. Since foreigners paid more for Dutch goods than what they sold them, the difference had to be made up with cash (i.e. gold and silver money). In other words, if an English merchant exports \$40 worth of raw wool to Holland and imports \$100 worth of finished cloth from Holland, then, on net, Holland gains \$60 in cash and England loses \$60 in cash. By constantly maintaining such a balance of trade, foreign gold & silver cash was constantly being 'sucked into' the Netherlands. And *that* is why the Dutch are rich - or so the Mercantilists concluded.

Mercantilist policy

The policy conclusion in the royal courts of England, France, Spain, etc. was that the only way to become prosperous is to 'beat the Dutch' at their own game. That is, do what it takes to flip the balance of trade around. The basic goals of 'Mercantilist' policy were:

- (1) Export as much as possible and import as little as possible.
- (2) Make sure your exports are high-value goods – luxuries, manufactures – which will bring in lots of money.
- (3) If you must import, import only essential low-value goods that are absolutely necessary for your industries – that is, only raw materials and other basic necessities you simply can't find at home.

To achieve these goals, Mercantilists called on the **government** to take a very active and interventionist role in the economy. The government was called upon to do many things, including:

- imposing tariffs and quotas to discourage imports
- handing out export subsidies ('bounties') to encourage exports;
- forbidding or restricting people from taking cash out of the country by all sorts of direct controls and laws.

Mercantilists also recommended that governments help out domestic private businessmen set up high-value import-substitution and export-oriented industries (e.g. setting up your own domestic cloth-finishing industry). This could be encouraged by:

- subsidizing these industries directly
- chartering flagship '**charter companies**' with exclusive government-guaranteed monopolies over particular areas of industry & commerce (by minimizing 'destructive competition' at home, the Mercantilists said, your industries have a better chance to succeed abroad)²
- government should invest in helpful domestic infrastructure (ports, roads, etc.)
- if private capitalists still can't afford to set them up, have the government set up and run these industries itself as State enterprises.

Finally, and most ominously, the State was also called on to use its **diplomatic & military** muscle whenever it could to not only to promote the country's trade abroad, but, almost as importantly, to hamper the trade of competing nations, e.g.

- force all other nations to open their markets (lower tariffs, etc.) for our exports *and* close their markets (high tariffs, etc.) to the exports of our competitors;
- force all other nations to give us access to their raw materials for cheap *and* not to sell those raw materials to our competitors; if need be, conquer and **colonize** them.
- if a competitor happens to own a source of raw material or valuable resources, make war and conquer it for yourself;

In sum, Mercantilists did *not* believe there were mutual gains from trade, where both exporters (sellers) and importers (buyers) benefited. Rather they saw it as a zero-sum game

² Examples of British monopoly charter corporations which you might have heard of include the Merchant Adventurers (1552), Muscovy Company (1555), Mines Royal Company (1568), Levant Company (1581), East India Company (1600), Virginia Company (1606), Cockayne Company (1612), Royal Africa Company (1660), Bank of England (1694), South Sea Company (1711), etc. The Dutch, French and Spanish had similar charter companies.

- exporters always win, importers always lose, so export as much as possible, import as little as possible. Trade was perceived as some kind of war -- a war of every nation against every other nation -- to see who could export most and import least. And the role of the State was to actively help out in this endeavor - legally, financially and militarily.

This little list nearly summarizes the understanding of economic policy (& international relations) of European countries during the 17th and most of the 18th C. Its results (and scars) are still with us today.

Showcase: America

Mercantilist ideology was highly war-mongering. In the course of the Mercantilist era, England launched many wars against the Dutch (1652-54, 1665-67, 1672-74, 1781-84) and just as many against the French (1689-97, 1702-13, 1744-48, 1756-63). Mercantilist logic loomed large in the motivation and conduct for these wars - the English strategy focused on seizing colonies, dominating raw material sources, disrupting the commerce of rivals and extracting exclusive trade terms for itself in the peace treaties

New York, of course, was one of these prizes. The old Dutch colony of New Amsterdam was captured by the English in 1664 in a quarrel over trade that turned to open war. (Dutch retaliated by seizing Suriname; when peace was finally negotiated, Dutch decided they would rather hold on to sugar & coffee-producing Suriname, and let the English keep smelly old New York.)

That the United States itself is no longer a part of Great Britain is also in good part a direct result of Mercantilist policy. It was British Mercantilist laws that proved so unbearable for American colonists and led them unto revolt in 1776. In Mercantilist logic, the American colonies were supposed to serve merely as a source of cheap raw materials (cotton, hemp, pitch, timber, iron ore, indigo, etc.) for English industries, and a captive market for English-manufactured high-value goods (finished cloth, metallurgy, crafts). All manufacturing in the colonies was severely restricted or forbidden by law. At one point, an American colonist who wanted something as simple as a nail, had to import it from England. By the Navigation Acts, American colonists were also forbidden from trading with any other country. They could only trade with Britain.

Of course, the colonies being so far away and difficult to supervise, these Mercantilist laws were frequently flouted – illegal production was carried on, foreign smugglers routinely visited American ports. This had been going for so long that American colonists had grown quite used to it. But in the 1760s, the British crown realized it couldn't turn a blind eye to these goings on and decided to enforce the Mercantilist laws strictly in the colonies. This provoked the chain of events that led to the American Revolution of 1776 - the same year Adam Smith published his *Wealth of Nations*.

LIBERALISM

The travails of the innumerable Mercantilist-driven wars, fueled dissenting voices in late 18th C. Europe and prompted reconsideration of the sense and purpose of economic policy. Strong opponents of Mercantilism arose, which included Scottish philosophers like David Hume and Adam Smith and French Enlightenment thinkers like François Quesnay and Jacques Turgot.

Mercantilism, Smith and his fellow liberals argued, was an expensive, pointless endeavor based on a foolish premise. The prosperity of a nation lies not in the amount of gold & silver it sucks in by forcing a "favorable trade balance". A nation's prosperity is measured by the standard of living of its citizens. And that depends on actual commodities people have access to, consume and enjoy, not how much gold & silver they keep jealously locked away in a strongbox. If greater standards of living – if more goods and commodities – can be had by importing them from our neighbors – even our enemies - then it is a *good* thing. Trade is not and should not be a war, the liberals argued. Trade is of mutual advantage to all countries.

The onus was on the liberals to prove it. And this **Adam Smith** did carefully in his 1776 masterpiece, the *Wealth of Nations*, widely regarded as the first systematic treatise in economics. Adam Smith's premise was simple. If nations specialize in what they're good at producing, and trade with other nations for what they need, there will be more commodities to go around, not only for your own countrymen, but for everybody. He compared Mercantilism to a household who tried to do everything itself.

"It is the maxim of every prudent master of a family, never to attempt to make at home what it will cost him more to make than to buy. The tailor does not attempt to make his own shoes, but buys them from the shoemaker....

What is prudence in the conduct of every private family, can scarce be folly in that of a great kingdom. If a foreign country can supply us with a commodity cheaper than we ourselves can make it, better buy it of them with some part of the produce of our own industry, employed in a way in which we have some advantage." (Adam Smith, 1776, *Wealth of Nations*)

So, for example, if England was better at producing cloth and France was better at producing grain, then England should **specialize** in the production of cloth and France specialize in the production of grain, and then trade cloth and grain with each other. The end result, Smith argued, is that *both* English and French consumers will have *more* cloth & *more* grain than if they tried to do both alone. Trade allows specialization, and that *increases* the "size of the pie" so that *everybody* is better off.

So the English *shouldn't* be discouraging imports from France, nor the French discouraging imports from England. On the contrary, open trade, and let grain flow one way, and cloth the other. Both English and French citizens will be better off as a result.

And the government's role? *Laissez faire* - leave it be, let trade proceed unhampered and free. The practical policy recommendations of Liberals like Adam Smith were the exact opposite of Mercantilism: remove tariffs & quotas, cancel export subsidies, abolish state-sponsored monopolies, stop pursuing expensive and dangerous wars and colonial empires.

This was echoed in the popular liberal slogans of the day - "free trade", "non-interference", "That government is best which governs least", *Pas trop gouverner* ("Govern not too much"), "*Laissez-faire et laissez-passer, le monde va de lui-même*" ("Let them do and let them pass, the world goes on by itself").

ABSOLUTE vs. COMPARATIVE ADVANTAGE

Adam Smith showed how there were mutual gains to be made from trade if England is more efficient in one thing, and France more efficient in another thing. Adam Smith's theory is sometimes called the theory of *absolute advantage*.

For instance, suppose it takes English workers two hours to produce one ream of cloth and eight hours to produce one bushel of grain, while it takes French workers three hours to produce one ream of cloth and five hours to produce one bushel of grain. In summary:

England

1 ream of cloth = 2 hours of work
1 bushel of grain = 8 hours of work

France

1 ream of cloth = 3 hours of work
1 bushel of grain = 5 hours of work

Evidently, as English workers take less time to produce a ream of cloth, we can say English workers are more *efficient* than French workers in cloth production. That is, that England has an *absolute advantage* in cloth production.

In grain, French workers take less time to produce a bushel of grain than the English - that is French workers are more efficient in grain production than English workers. That is, France has an *absolute advantage* in grain production.

Thus, Smith argued, England should *not* try to produce grain. It should focus on producing cloth - that is put all its workers in cloth production and none³ on grain. France, in turn, should put all its workers on grain production and none on cloth. Where do English get grain to eat or French get cloth to wear? Trade with each other, of course!

Thus, for Adam Smith, the old Mercantilist ethos about maximizing exports and minimizing imports was ridiculous. Yes, England should export cloth. But there's nothing wrong with importing grain. On the contrary, that's the point of trade. You *shouldn't* try to produce both cloth and grain in England. Producing grain ties up English workers that could be making cloth instead. Put your workers making cloth, and import grain from France. Don't treat trade as war. Trade is mutually beneficial.

Absolute vs. Comparative Advantage

Adam Smith's logic seems impeccable. Let each country specialize in what it is most efficient at - let England specialize in cloth, let France specialize in grain - and then trade the results. In the end, *both* English and French consumers will end up with *more* cloth and *more* grain than they would have otherwise.

³ As we shall see later, this 'none' should be qualified. Technically, just say England should put less workers on grain production, and more workers on cloth production.

That's all very good - so long as England is more efficient at cloth, and France more efficient at grain. But what if England is *not* better than France at producing *anything*? e.g. suppose it takes English workers 4 hours to produce a ream of cloth, all other numbers are as before. Then our situation changes to:

England

1 ream of cloth = 4 hours of work
1 bushel of grain = 8 hours of work

France

1 ream of cloth = 3 hours of work
1 bushel of grain = 5 hours of work

Now we have a problem. English workers are less efficient than French workers at producing cloth. They are *also* less efficient at producing grain. France has an absolute advantage in *both* cloth and grain, and England has an absolute advantage in *nothing*.

If France is more efficient than England at both things, it seems there is no point for France to specialize in one thing and trade with England for the other. France is better at producing both! It should just produce both, and not trade with England at all.

For this dispiriting situation, Smith didn't have an answer. He suspected that if nations didn't have an absolute advantage in something, they wouldn't have a reason to trade with each other (or rather, others wouldn't have a reason to trade with them).

But forty years after Smith, an English stockbroker named **David Ricardo** (1817) had an answer.⁴ He asserted that *even if* a nation is not better at anything than another (or is better at producing *everything*), there are *still* gains from specialization and trade. But if you're not good at producing anything, how do you know what to specialize in? Ricardo had the answer: look for the good in which you have a *comparative advantage*.

That is, you don't need to have an absolute advantage in any good, you don't need to be absolutely more efficient than another country. You just need to be *comparatively* efficient. And *every* country, Ricardo argued (and proved), always has a comparative advantage in *something*, even if they have an absolute advantage in both or in nothing.

Ricardo's thesis is an astounding and counter-intuitive theorem. But it has formed the foundation of the "free trade" movement of classical Liberalism, that continues to this day. Their logic is that as there are always mutual gains to be made from trade, any barriers to trade imposed by governments will block the realization of those gains. In short, they assert that trade barriers make *people worse off than they might otherwise be*.

Since the idea of comparative advantage is of such great political importance, it is worth going through it with care, to see how it works and what it says.

⁴ This is found in Ricardo's main work, *Principles of Political Economy and Taxation*, published in 1817.

THEORY OF COMPARATIVE ADVANTAGE

Time to turn to a bloodthirsty example: suppose we have two hunters, A and B, in a forest, trying to catch rabbit and deer.

Hunter A	Hunter B
8 rabbits p/hour	5 rabbits p/hour
<i>or</i>	<i>or</i>
2 deer p/hour	1 deer p/hour

Obviously, A is more absolutely efficient at hunting *both* deer & rabbit.

Suppose they each only have one hour to spend hunting, then, on their own (no trade):

Hunter A's options: hunt rabbits for an hour (8 rabbits) *or* hunt deer (2 deer) *or* spend a half-hour on each (4 rabbits + 1 deer)

Hunter B's options: hunt rabbits for an hour (5 rabbits) *or* hunt deer (1 deer)

Right Specialization Case: Gains from Trade

Suppose Hunter A specializes in deer, Hunter B in rabbits, then the result after one hour is:

Hunter A	Hunter B
2 deer	5 rabbits.

Now suppose they exchange: 1 deer for 4.5 rabbits. Thus, after trade:

Hunter A has: 1 deer, 4.5 rabbits (better off by 0.5 rabbit)

Hunter B has: 1 deer, 0.5 rabbit (better off by 0.5 rabbit)

Here specialization and trade improved the situation than if they had produced by themselves.

Wrong Specialization Case: Losses from Trade

Suppose Hunter A specializes in rabbits, Hunter B in deer, then, after one hour:

Hunter A	Hunter B
8 rabbits	1 deer.

Now exchange: 1 deer for 4.5 rabbits. Thus, after trade:

Hunter A has: 1 deer, 3.5 rabbits (worse off by 0.5 rabbit)

Hunter B has: 4.5 rabbits (worse off by 0.5 rabbit)

So here specialization & exchange *worsened* the situation if they had produced by themselves.

Case II seems to indicate that trade can be bad. Yes, it can be, but *not* if you specialize according to your "comparative advantage". This was Ricardo's insight.

Theory of Comparative Advantage: *If people or nations specialize in the good in which they have a comparative advantage (= lower opportunity cost) in producing, then there are always mutual gains to be made from trade.*

Opportunity Cost: The opportunity cost of something is the value of the next-best thing *foregone* to acquire it.

In our example:

Hunter A: opp. cost of 1 deer = 4 rabbits foregone

Hunter B: opp. cost of 1 deer = 5 rabbits foregone

or we can see this the other way around:

Hunter A: cost of 1 rabbit = 0.25 deer foregone

Hunter B: cost of 1 rabbit = 0.20 deer foregone

The *opportunity cost* of deer is *lower* for A than for B.

The *opportunity cost* of rabbit is *higher* for A than for B.

By theory of comparative advantage, A should specialize in deer and B in rabbit.

This is exactly what we had in Case I above and that is why we had gains from trade.

In Case II, the hunters specialized in the wrong thing -- which is why they had losses.

Can a person ever have lower opportunity cost in *both* goods? No. When we are dealing with two people (or countries) exchanging two goods, if one has lower opportunity cost in one good, the other will *necessarily* have a lower opportunity cost in the other good. This is Ricardo's fundamental insight.

So, there are gains from specialization and trade even if one of the traders is better at producing everything than another, so long they specialize according to the principle of comparative advantage.

The Theory of Comparative Advantage applies to countries as well as persons.

Example:

Suppose US & Japan manufacturing costs (in terms of hours worked) are as follows:

US

1 computer = 40 labor hours

1 stereo = 10 labor hours

Japan

1 computer = 30 labor hours

1 stereo = 6 labor hours

Japan is more absolutely efficient at both. How do we decide? Check opportunity cost:

US: opp. cost of 1 computer = 4 stereos foregone

Japan: opp. cost of 1 computer = 5 stereos foregone

US has a lower opp. cost for computer. US should concentrate on producing computers, Japan should specialize in stereos & exchange the results.

What are the gains from trade? Well, suppose both nations decide to work for 120 labor hours each. Then US will produce 3 computers and Japan 20 stereos. Suppose they trade 2 American computers for 9 Japanese stereos. The final positions are:

US: 1 computer, 9 stereos

= equivalent in domestic terms to 40 l.h. + 90 l.h. = 130 l.h.

So US got 130 domestic hours worth of goods while actually working only 120 hours; saved 10 hours of extra work!

Japan: 2 computers, 11 stereos

= equivalent in domestic terms to 60 l.h. + 66 l.h. = 126 l.h.

So Japan got 126 hours worth of goods but actually worked only 120 hours; saved 6 hours worth of extra work.

The hours saved are the mutual gains from trade.

Finally, let's revisit the example given in the introduction, to just round off the discussion.

England

1 ream of cloth = 4 hours of work
1 bushel of grain = 8 hours of work

France

1 ream of cloth = 3 hours of work
1 bushel of grain = 5 hours of work

France has absolute advantage in both cloth and grain, England has absolutely advantage in nothing. But now....

England: opp. cost of 1 grain = 2 cloth foregone
France: opp. cost of 1 grain = 1.67 cloth foregone

France has lower opp. cost for grain, so France has comparative advantage in grain. Thus, France should specialize in grain and England in cloth.

Are we sure England has comp. advantage in cloth? Yes. Again, it will *always* be the case that if one country is comparatively efficient at one thing, the other country is *necessarily* comparatively efficient at another thing. We've already seen that France has comparative advantage in grain, so England *necessarily* has the comparative advantage in the *other* thing (cloth).

Mathematically, that is because opportunity costs are reciprocals. If you want to check, look at the opportunity costs for cloth:

England: opp. cost of 1 cloth = 0.5 grain foregone
France: opp. cost of 1 cloth = 0.6 grain foregone

England has lower opp. cost in cloth, so has a comparative advantage in cloth, as we expected.

Notice that $0.5 = 1/2$ and $0.6 = 1/1.67$, that is the opp. cost of cloth is the reciprocal of the opp. cost of grain. So you really only need to check the opportunity costs of one good to figure out the comparative advantage. If one good (e.g. grain) is the comparative advantage of one country, then the other good (cloth) is *necessarily* the comparative advantage of other country.

So, as we see, it doesn't matter if you're not *absolutely* efficient at producing something. You're always *comparatively* efficient at one thing. So it is *still* better if both countries specialize and trade.

MARKETS & PRICES

In our numerical examples above we *assumed* certain exchanges took place (e.g. 1 deer for 4.5 rabbits) but we did not explain why those precise amounts were exchanged. Let us look at this issue more closely.

What is a **market**?

This is hard to define. In short, it is the "place" where things are exchanged. It need not be anywhere in particular. It can be abstract, e.g. the "fish market" may exist in the Bronx, but where is the "housing market"?

Markets are also "interrelated". Our decision to exchange rabbit for deer really involves two markets -- one for deer, another for rabbit. But they're intimately connected in our example because we buy deer *with* rabbit, and vice-versa. As the French economist Leon Walras noted: "In fact, the whole world may be looked upon as a vast general market made up of diverse special markets where social wealth is bought and sold." (1874). A more recent American economist attempted the following definition:

"By "market" is meant the entire complex of institutions which people buy and sell and hire and are hired and borrow and lend and trade and contract and shop around to find bargains" (Thomas Schelling, 1978)

In short, we don't have a clear definition. It is wherever people "go" to exchange things.

Market prices are the rates at which things are exchanged for one another *between* people (or nations). These must be distinguished from **domestic prices**, the rates at which a single person (or nation) exchanges "with itself".

Consider the simple "no-trade" situation again for Hunters A & B. What is the *price* of deer for Hunter A? The amount of rabbits that he has to forego to acquire one deer. So the old opportunity cost notion is also the **domestic price** notion.

Domestic price of 1 deer for Hunter A = 4 rabbits

Domestic price of 1 deer for Hunter B = 5 rabbits

Domestic prices help guide the establishment of market (or exchange) prices.

Looking only at domestic prices, we can see immediately that deer is "more expensive" domestically for Hunter B than Hunter A. So we can think of Hunter A as the cheaper producer of deer and so he will sell deer to B in exchange for rabbits. But at what price is this sale to be conducted?

Hunter A will not sell a deer to B below the price which it costs him to produce it (his domestic price). So he will only sell a deer if he can get *at least* 4 rabbits in return. 4 rabbits is the *seller's minimum price*.

Hunter B is the buyer of deer. He will not pay more for deer than it costs him to produce it himself (*his* domestic price). So he will only buy a deer if it costs him less than 5 rabbits. So 5 rabbits is the *buyer's maximum price*.

The actual *market price* of deer is the ratio of amounts exchanged between A & B. It will be somewhere between the seller's minimum price and the buyer's maximum price, i.e. somewhere between 4 and 5 rabbits.

seller's minimum price < $\frac{\text{market price}}{\text{(exchange ratio between traders)}}$ < buyer's maximum price

In our example, we chose 1 deer for 4.5 rabbits as the market price of deer. It happens to be exactly in between 4 and 5. Notice that in this case, Hunter A & Hunter B made exactly the same gains from trade (0.5 rabbit each).

But we could have chosen the lower market price of 1 deer for 4.2 rabbits. It is acceptable to both A and B. But the gains from trade are not equally split in this case. If you go through the math as before, we end up with:

Hunter A has: 1 deer, 4.2 rabbits (better off by 0.2 rabbits)

Hunter B has: 1 deer, 0.8 rabbit (better off by 0.8 rabbit)

Both still gained, but Hunter B made the bigger gain.

Or we could have increased the market price to 1 deer for 5 rabbits. It is still acceptable to both. But all the gains from trade will now accrue to A, while B is no better off. Go through the arithmetic to see this.

So although we cannot, at this point, pin down an exact market price, we can set the *range* in which it will lie. Both still gain, but as it approaches either side of that range, one party gains more and the other gains less.

But we can *never* have it that the exchange price falls below 4 or rises above 5, for then one of the parties makes an actual *loss* from trade, e.g. suppose 1 deer is exchanged for 3 rabbits. Then the outcome would be:

Hunter A has: 1 deer, 3 rabbits (worse off by 1 rabbit)

Hunter B has: 1 deer, 2 rabbits (better off by 2 rabbits)

B is now really worse off than if he had simply tried to do it by himself. He has *no incentive* to accept such a trade -- and if it is proposed, he will reject it.

The converse applies (i.e. A will reject) if the exchange price rises above 5.

In sum: there is an entire *range* of acceptable exchange prices between the seller's minimum price and the buyer's maximum price. Any exchange price outside those bounds will be unacceptable to one of the traders and so trade will not ensue. But if the exchange ratio stays within those bounds (anywhere within those bounds), mutual gains will definitely be made. Both will be better off. But, depending on what the exact price is, some might make more gains than others.

Caveat:

It is *not* always the case that the "midpoint" in the price range necessarily means that gains are equal.

Look at the US/Japan case. Here 2 computers were exchanged for 9 stereos, so the exchange price was 1 computer for 4.5 stereos. That is between the American seller's price (1 comp. for 4 stereos) and the Japanese buyer's price (1 comp. for 5 stereos).

But although the price is *exactly* in between buyer's & seller's price, we saw that America gained more (10 hours) than Japan (6 hours). So the gains can be unequal at the midpoint.

But the general principle that the *closer* the price is to the seller's minimum, the greater the gains for the buyer (& vice-versa) continues to hold true. To see this, lower the price, so that US exchange 2 computers for 8 Japanese stereos. You will see that, in this case, Japan makes *all* the gains from trade.

THE ROLE OF DEMAND

We said actual exchange price lie somewhere between the buyer & seller's prices. Do we have a way to determine where exactly? Yes. But here we have to move away from our simple story and start paying attention to **demand**.

To understand why demand is important, consider the simplest case of, say, Japan and the tiny Pacific island nation of Nauru. Suppose Nauru is as efficient as the United States in our earlier example (e.g. Nauru can produce 1 computer for 40 labor hours, 1 stereo at 10 labor hours). Then going through the same exercise, by the *theory* of comparative advantage, there is scope for trade between Japan & Nauru. So, Japan should produce stereos and Nauru produce computers and then trade the results.

The problem, of course, is that Nauru is a *tiny* country with a very small labor force and very few consumers, while Japan is a behemoth. Even if everybody in Nauru was put to work producing computers, it is very doubtful that Nauru would produce *enough* computers to satisfy the Japanese consumers' need for them. By the same token, if Japan put all its workers on stereos, it would probably have produced far more stereos than Nauru islanders could possibly ever use.

So it would be rather reckless for Japan to just do its comparative advantage math and decide to specialize completely in stereos, relying on Nauru to supply its computers.

Is comparative advantage inapplicable now? No. There are still gains to be made from specializing and trading according to comparative advantage, just don't necessarily specialize 100%. Japan might close down one or two computer factories and open a couple of stereo factories, while Nauru does the reverse. But, if Nauru is the only trading partner, Japan cannot divest itself entirely of its domestic computer industry.

So comparative advantage tells you the *direction* of specialization & trade, but it does not tell you by how much.

The *extent* to which Japan will specialize in stereos & trade the results will depend on the size of its needs and the size of its trading partners.

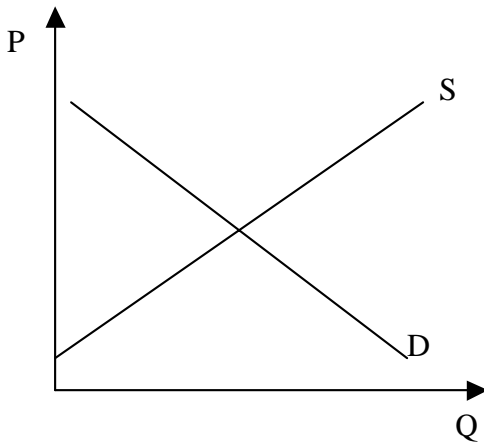
Or, putting it another way, the degree of Japanese specialization & volume of trade will depend partly on *demand* -- it's own, and that of its trading partner's.

To analyze this in full, we need to turn to demand & supply analysis. More math is about to come into play, but it is worthwhile.

DEMAND & SUPPLY

Demand & supply theory is unavoidable in economics. We have to introduce it at some point, so why not here?

Basically it is this diagram:



It is supposed to represent a market (e.g. the market for computers in Japan). P is the price of a computer. Q is the quantity of computers.

The D line is known as the "**demand curve**"

The S line is known as the "**supply curve**"

So let's get to the nitty gritty.

But before we do so, I must warn you of something: contrary to what you might have learnt in high school, for some stupid reason, economists like to read their graphs with the axes the other way around. So when reading D & S diagrams, *always start from the vertical axis and go to the horizontal axis*. This might be confusing and unfamiliar, but try to get used to doing it that way.

Reading the Demand Curve:

The D-curve depicts the *quantities* of computers that Japanese consumers want & are able to buy at various given prices.

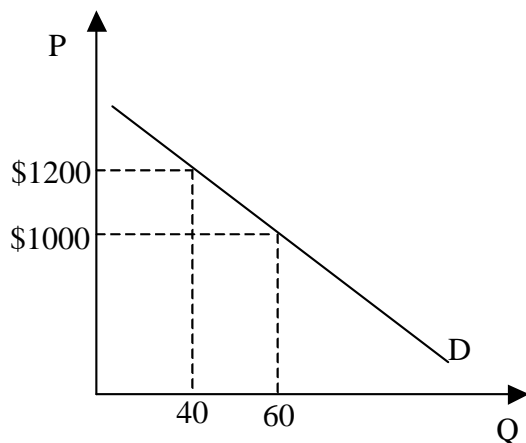
Demand: the quantity of a good consumers are willing and able to buy at a particular price.

Notice the critical words – willing *and* able. *Both* have to be fulfilled. If you desire something but have not the means to buy it, that doesn't count as demand. Notice also the

direction of causality from price to quantity: *if price, then quantity*, e.g. *if price is \$1000, then quantity demanded is 60*.

So, for a *given* price for a computer (e.g. \$1000) on the vertical axis, go along horizontally until you hit the D curve and then go vertically down. The quantity you read on the horizontal axis (60) is the corresponding amount of computers Japanese consumers want to buy at that price.

If the price rises to \$1200 per computer, then do this again. Go from the \$1200 point on the vertical axis all the way along until you hit the D curve and go down. Notice that, at this price, Japanese demand will be 40 computers (a lower number).



Notice that in our example when the price of computers went up, the demand for computers went down. This is known as the **Law of Demand**: as price rises for a good, the quantity demanded of that good declines. The more expensive a computer is, the fewer computers Japanese consumers are willing to buy.

Why? There are two principal reasons, to which economists have attached special labels:

(1) **Income Effect**: some people simply cannot afford them at that higher price. They'd like to, but it is out of their budget reach. So, when price goes up, they are no longer *able* to buy.

(2) **Substitution Effect**: other people may be able to afford it, but decide it isn't really worth it anymore and prefer to save their money to buy something else instead. Frequently a substitute product, e.g. they may decide to buy cheap typewriters instead of a computer. Some families may have wanted to buy a computer for each of their kids but decided to opt instead for just one for the whole family and put the rest of the money towards a Nintendo set. In short, when price goes up, they are no longer *willing* to buy.

The opposite reasoning works if the price of computers go down. More will be bought because some people can now afford them, find it worthwhile, etc.

Reading the Supply Curve

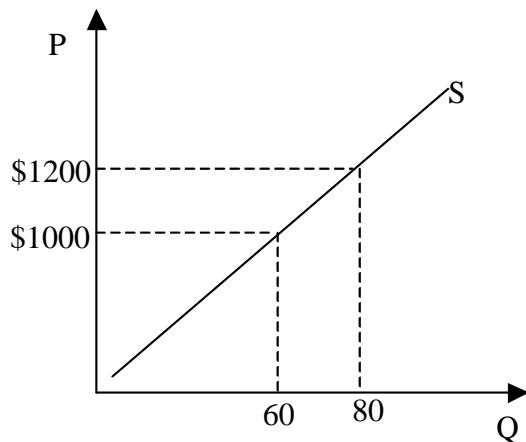
The S-curve depicts the *quantities* of computers that Japanese firms are willing to produce & sell at various given prices.

Supply: the quantity of a good firms are willing to produce and sell at a particular price.

Again, the direction of causality runs from price to quantity: *if price, then quantity*, e.g. *if price is \$1000, then quantity supplied is 60*.

So, going through the logic (again, from vertical to horizontal axes), for a *given* price for a computer (e.g. \$1000) on the vertical axis, go along horizontally until you hit the S curve and then go vertically down. That is the corresponding Japanese supply of computers at that price (in our diagram, 60).

If the price rises to \$1200 per computer, then do this again. Go from the \$1200 point on the vertical axis all the way along until you hit the S-curve and go down. Notice that, at this price, Japanese producers will be willing to sell 80 computers (a higher number).

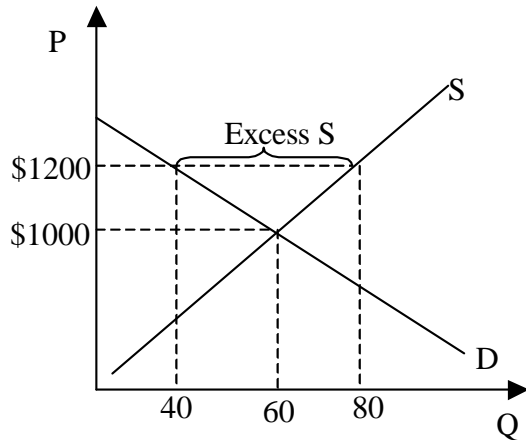


So, for the S-curve, when the price of computers went up, the *supply* of computers went up as well. This is known as the **Law of Supply**: the higher the price for computers on the market, the more computers firms are willing to produce and sell.

Why? The reasoning here is a bit more intricate and not worthwhile pondering on too deeply. The *basic* notion is that the greater the price on the market, the greater profits can be made on every unit sold by computer firms. This prompts them to produce more. That is not really a good explanation, but it will have to do for now.

Reading D & S Together

When you put them together, you get the picture we saw earlier. Now, look at the following example:



What does it tell us?

Remembering, once again, to start reading from the vertical axis, let us begin with, say, the price of computers at \$1200. At this price, notice that the quantity demanded by Japanese consumers is 40 computers, while the quantity supplied by Japanese firms is 80 computers. Far more computers are produced in Japan than people are willing to buy. This is known as a situation of **excess supply** or a **glut**. The size of the excess supply is measured by the horizontal gap between the quantities. So when price is \$1200, 40 ($= 80 - 40$) excess computers are produced (i.e. lie unsold).

What happens in such a situation? *The price for computers falls.* This is sometimes known as the **Law of Markets**: in situations of excess demand, the market price rises; in situations of excess supply, the market price falls.

See what happens when the market price falls from \$1200 to \$1000. At the new price (\$1000), the quantity of computers demanded is 60, while the quantity of computers supplied is....60. The quantities match. At this price (\$1000), Japanese firms are producing exactly the amount of computers that Japanese consumers are willing to buy. We say that in this situation that the computer market has **cleared**. There is no excess.

The basic theory of Demand & Supply then, tells us that market prices adjust until markets clear.

So let us recapitulate what we have seen so far:

(1) The theory of comparative advantage tells us *which* good in which to specialize in order to make gains from trade.

(2) But the determination of the *extent* of specialization, i.e. the amounts imported & exported, as well as the *exact* price at which these will be exchanged, depends on demand as well.

And remember one more thing: *everything* we have said about trade between countries *also* applies to trade between people, between people & firms, between firms and firms, etc.

Final note: remember that in our examples of the theory of comparative advantage, we "showed" how gains were created from trade – rabbits that popped up from nowhere, hours of work that were saved, etc. We calculated this by making some arbitrary assumptions about how much they traded. Well, now, by S&D, we have pinned down an exact price *and* quantity. Where is the magical rabbit? What are the gains from participating in the market? In fact, the gains can be read on the diagram directly as the area of the triangles under the curves. To measure that exactly, we need more intricate tools to measure welfare gains and losses. So we shall turn to that next.